



STARS ACADEMY LAHORE

MULTAN CAMPUS

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STARS ENTRY TEST SYSTEM-2019

TEST SESSION MDCAT

Test Code: T6

Time Allowed: 150min

BIOLOGY

- Which of the following best expresses the concept of the word "allele"?
A) Genes for wrinkled & yellow
B) Phenotypes
C) Genes for wrinkled & round
D) Mutations
- Which of these traits zigzags from maternal grandfather through a carrier daughter to a grandson?
A) Autosomal
B) X-linked
C) Y-linked
D) X&Y linked
- _____ of haemophiliacs suffer from Haemophilia A:
A) Less than 1%
B) About 20%
C) 80%
D) 10%
- Haemophilia B is due to abnormality of factor:
A) VIII
B) IX
C) XI
D) IV
- Each type of cone cell in retina has specific light absorbing protein called:
A) Albumin
B) Opsin
C) Haemoglobin
D) Auxin
- Gene for blue opsin is present on chromosome number:
A) 7
B) 9
C) 11
D) 19
- Red colour blindness is called:
A) Protanopia
B) Deuteranopia
C) Tritanopia
D) Protanomalous
- The risk of a colour blind child is _____ when father is colour blind while mother is normal:
A) 0%
B) 25%
C) 50%
D) 100%
- Which of the following is an example of x-linked recessive trait in humans?
A) Hypophosphatemic rickets
B) Colour blindness
C) Baldness
D) Beard growth
- Which of the following will be Colour blind?
A) $X^C X^C$
B) $X^C X^c$
C) $X^c Y$
D) $X^c y$
- Of both normal parents, the chance of a male child becoming colour blind are
A) No
B) Possible only when all the four grand parents had normal vision
C) Possible only when father's mother was colour blind
D) Possible only when mother's father was colour blind
- Which trait in humans is an example of multiple allele?
A) Skin color
B) Rh-blood group
C) Eye color
D) A B O-blood group
- Position of an allele within a DNA Molecule is
A) Origin
B) Locus
C) Epistasis
D) Pleiotropy
- it is an example of codominance
A) Blood group A
B) Blood group B
C) Blood group AB
D) Blood group O
- Tritanopia is a blindness of
A) Red colour
B) Green colour
C) Blue colour
D) Pink colour
- How many linkage groups will be present in the case of human beings?
A) 23
B) 44
C) 46
D) 24
- Skin color in humans, caused by several genes at several loci, is an example of
A) Continuously varying trait
B) Polygenic inheritance.
C) Incomplete dominance.
D) Both A & B
- In sex-linked color blindness, the more commonly found are _____.
A) Color-blind females
B) Both are about equal
C) Color-blind males
D) Color blindness is unrelated to sex-linkage.
- An individual with blood type A marries an individual with blood type B. What blood types could their offspring exhibit?
A) AB
B) O
C) B
D) All of these are possible
- _____ is a dihybrid
A) RRYy
B) rrYy
C) RrYy
D) Rryy
- The principle of independent assortment is not true for

- A) Incomplete dominance
B) Heterozygotes
C) Homozygotes
D) Linked genes
22. A carrier woman will have a hemophiliac son when married to a:
A) Normal man
B) Either normal or hemophiliac man
C) Affected man
D) Carrier man
23. What is the risk of a color blind child in a family when father is color blind but mother is carrier?
A) Zero %
B) 50%
C) 25%
D) 100%
24. Choose the best statement that explains Mendel's law of segregation:
A) Dominant and recessive traits are transmitted independently from one generation to the next so that neither trait has any influence on the inheritance of the other
B) Inheritance of one gene is not influenced by the inheritance of another and genes assort independently in successive generations
C) One allele of a gene is dominant over the other
D) One gene masks the effect of the other and is not transmitted independently from one generation to another
25. Alleles of a gene are found on
A) Same chromosome
B) Homologous chromosomes
C) Non homologous chromosomes
D) Any chromosomes
26. Ratio 9 : 3 : 3 : 1 is due to
A) Duplicate genes
B) Monohybrid cross
C) Lethal genes
D) Dihybrid cross
27. Multiple alleles are characterized by
A) More than two alternate forms of a gene found at same locus
B) More than two alternate forms of a gene found at different loci
C) Occurrence of one gene in two chromosomes
D) None of the above.
28. Crossing-over causes:
A) Expression of recessive genes
B) Recombination between linked genes
C) Synapsis between homologous chromosomes
D) Linkage between dominant genes.
29. Telomere repetitive DNA sequences control the function of eukaryotic chromosomes because they:
A) Act as replicons
B) Help chromosome pairing
C) Are RNA transcription initiator
D) Prevent chromosome loss
30. _____ is the proportion of recombinant types between two gene pairs as compared to the sum of all combinations
A) Gene Frequency
B) Allele frequency
C) Recombination frequency
D) Recombinant types
31. Two parents, both of blood group A, have daughter of blood group O.
What is the probability that their next child will be a boy who has blood group O?
A. 0.125
B. 0.50
C. 0.375
D. 0.75
32. The four children of two parents each have a different blood group of the ABO series. What were the blood groups of the parents?
A) A and AB
B) A and B
C) A and O
D) B and Ab
33. Blood group A can be transfused only into:
A) O recipients
B) A recipients
C) A & AB recipients
D) AB recipients
34. All of the following are continuously varying traits except:
A) Kernel colour in wheat
B) Skin colour in humans
C) Height in humans
D) Tongue rolling in humans
35. How many possible alleles of ABO blood group are present in an individual?
A) 1
B) 2
C) 3
D) 300
36. Which one is true for crossing over?
A) Non-sister chromatids of homologous chromosome, meiosis
B) Non-sister chromatids of homologous chromosome, mitosis
C) Sister chromatids of homologous chromosome, meiosis
D) Sister chromatids of homologous chromosome, mitosis
37. A reversal in order of a segment of a chromosome:
A) Base substitution
B) Insertion
C) Deletion
D) Inversion
38. A pure breeding tall plant was crossed to dwarf plant. What would be probability of "Tt" genotype in F₂
A) 0.25
B) 0.50
C) 0.75
D) None of these
39. The gene D which controls Rh blood groups has how many alleles
A) one
B) two
C) three
D) four
40. F₂ wrinkled when self-fertilized produced
A) Round and wrinkled seeds
B) Only wrinkled seeds
C) Only round seeds
D) Seeds in between round and wrinkled

41. A linkage group is composed of genes which
 A) associate during prophase I
 B) are in the different chromosome
 C) segregate at mitosis
 D) are situated on the same chromosome
42. Feature correct to O-negative blood group:
 A) A & B antigen present
 B) Anti-A & anti-B antibody present
 C) Rh antigen present
 D) Rh antibody present
43. In dihybrid cross, out of 16 plants obtained, the number of different genotypes will be:
 A) 4
 B) 9
 C) 16
 D) 12
44. Blood group B phenotype contains anti-A antibodies in the serum and agglutinate any RBC with antigen:
 A) A
 B) B
 C) O
 D) None of these
45. What would be phenotype of a person with genotype $I^A I^B, Dd$?
 A) O -ve
 B) AB -ve
 C) AB +ve
 D) O +ve
46. Genotype of a light pink colored wheat grain will be:
 A) AaBBCC
 B) aaBbcc
 C) AABbcc
 D) AAbbcc
47. When an individual is having both the alleles of contrasting characters it is said to be
 A) Heterozygous
 B) Dioecious
 C) Monoecious
 D) Hermaphrodite
48. The gene with multiple alleles is called:
 A) Polygenic gene
 B) Epistatic gene
 C) Pleiotropic gene
 D) Polymorphic gene
49. The genetic complement of a trait is called:
 A) Genotype
 B) Phenotype
 C) Karyotype
 D) Genome
50. Which is not true about linked gene?
 A) They reduce the chance of variation
 B) They are physical linked
 C) They may show independent assortment
 D) Linkage groups correspond to number of homologous pairs
51. Which of the following is discontinuously trait?:
 A) Human height
 B) Human skin color
 C) Human eye color
 D) ABO blood group
52. Genes showing linkage are always on:
 A) Same chromosome of different genomes
 B) Different chromosomes of same genome
 C) Same chromosome of same genome
 D) Different chromosomes of different genomes
53. What type of gametes will be formed by genotype RrYy?
 A) RY, Ry, rY, ry
 B) Ry, Ry, Yy, yy
 C) RY, Ry, ry, ry
 D) Rr, RR, Yy, YY
54. In Mendelian dihybrid cross, how many of progeny in F_2 generation possess genotype rryy?
 A) $\frac{1}{16}$
 B) $\frac{2}{16}$
 C) $\frac{3}{16}$
 D) $\frac{4}{16}$
55. A pea plant with yellow seed was crossed to a plant having green seeds. What will happen in F_1 ; if plants are true breeding?
 A) All seeds will be yellow
 B) All the seeds will be green
 C) Half of seeds will be yellow
 D) Both will be present in ratio of 1:2:1
56. When a tall and red flowered individual is crossed with a dwarf and white flowered individual, phenotype in the progeny is dwarf and white. What will be the genotype of tall and red flowered individual?
 A) TtRr
 B) TTRr
 C) TTRR
 D) TtRR
57. Pure Line breed refers to:
 A) Heterozygosity only
 B) Homozygosity only
 C) Heterozygosity and linkage
 D) Homozygosity
58. Which of the following terms represents a pair of contrasting character?
 A) Homozygous
 B) Heterozygous
 C) Allele
 D) Phenotypes
59. A cross used to ascertain whether a dominant is homozygous or heterozygous is termed:
 A) Monohybrid
 B) Back cross
 C) Reciprocal
 D) Linkage cross
60. When a red-flowered plant was crossed with a white flowered plant, F_1 generation consisted of majority of red-flowered plants. Genes for red colour were:
 A) Recessive
 B) Sex-linked
 C) Dominant
 D) assorted
61. Monohybrid cross is a cross between:
 A) Two individual differing in two traits
 B) Two individual of two different parents
 C) F_1 individual with a parents
 D) Two individual differing in one traits

62. How many pairs of homologous chromosomes are present in *Pisum sativum*
 A) five pairs B) six pairs C) seven pairs D) eight pairs
63. Which of the following characters of pea plant is dominant
 A) Axial flowers B) Terminal flower C) White flowers D) None of these
64. Filial is a Latin word. It means
 A) spring B) issue C) progeny D) descendent
65. The gene which controls ABO group has how many alleles
 A) one B) two C) three D) four
66. The gene which do not follow law of independent assortment
 A) crossed genes B) linked genes C) recessive genes D) none
67. During test cross, if all offsprings are phenotypically dominant then parents are
 A) homozygous B) one homozygous other heterozygous C) heterozygous D) none of these
68. Which of the following blood group is always Homozygous
 A) A B) B C) AB D) O
69. All the genes / alleles found in a breeding population at a given time are collectively called
 A) Gene pool B) Gene frequency C) Genotype D) Genetic drift
70. F₂ generation of a monohybrid cross yields the offspring in genotypic ratio of
 A) 3:1 B) 1:1 C) 1:2:1 D) 1:3:1
71. The gametes of parents having the genotype RrAA should be as
 A) RA, Ra B) ra, ra C) RA, rA D) Ra, rA
72. No antigen is found in the blood of person having the blood group
 A) A B) B C) AB D) O
73. Which one of the following phenotypic features of Man can be affected only by the genotype?
 A) height B) skin colour C) intelligence D) number of different blood group antigens
74. A woman with normal vision, but whose father was colour blind, marries a colour blind man. Suppose that the fourth child of this couple was a boy. This boy:
 A) Must have normal colour, vision
 B) Will be partially colour blind since he is heterozygous for the colour blind mutant allele
 C) Must be colour blind
 D) May be colour blind or may be of normal vision
75. In seven pairs of contrasting characters in pea plant studied by Mendel the number of flower based characters was:
 A) 1 B) 2 C) 3 D) 4
76. A condition, where a certain gene is present in only a single copy in a diploid cell is called:
 A) Heterozygous B) Monogamous C) Homozygous D) Hemizygous
77. Which methodology of Mendel was different and was the main reason of his success:
 A) He studied inheritance of single traits at a time
 B) He studied inheritance of several traits together
 C) He collected all data carefully
 D) He was capable of analyzing collected data mathematically
78. An allele is said to be dominant if:
 A) It is expressed in both homozygous and heterozygous conditions
 B) It is expressed only in second generation
 C) It is expressed only in heterozygous
 D) It is expressed only in homozygous condition
79. Heterozygous tall plant is crossed with a homozygous dwarf plant then the percentage of progeny having dwarf characters is:
 A) 0% B) 50% C) 25% D) 100%
80. If a cross between two individuals produces offspring with 50% recessive characters (a), then the genotypes of parents are:
 A) Aa X Aa B) AA X aa C) Aa X aa D) AA X Aa

CHEMISTRY

81. For acetic acid-sodium acetate buffer if $[\text{CH}_3\text{COOH}] = 2[\text{CH}_3\text{COONa}]$ then the pH of this solution.
 A) 4.74 B) 3.78 C) 4.44 D) 5.04
82. What is the pH 0.05 mol/dm³ sulphuric acid?
 A) 0.025 B) 0.1 C) 0.05 D) 1
83. About p^H the correct order is.
 A) Gastric juice > rain water > sea water > milk of magnesia
 B) Rain water > Gastric juice > sea water > milk of magnesia

- C) Milk of magnesia > rain water > sea water > Gastric juice
D) Milk of magnesia > sea water > rain water > Gastric juice
84. $2\text{HF} \rightleftharpoons \text{H}_2 + \text{F}_2$, $K_c = 10^{-13}$ at 2000°C which statement is correct.
A) High stability of HF C) Less stability of HF
B) Fast decomposition of HF D) None
85. Amongst the following hydroxides, the one which has the lowest value of K_{sp} at ordinary temperature (about 25°C) is
A) $\text{Mg}(\text{OH})_2$ B) $\text{Ba}(\text{OH})_2$ C) $\text{Ca}(\text{OH})_2$ D) $\text{Be}(\text{OH})_2$
86. When a catalyst is added to a reversible reaction in equilibrium state, the value of equilibrium constant
A) Increases B) Does not change C) Decreases D) Becomes zero
87. For equilibrium reaction $2\text{NO}_2(\text{g}) \rightleftharpoons \text{N}_2\text{O}_4(\text{g}) + 14.6 \text{ J}$, Increase in temperature would
A) Favor the formation of N_2O_4 C) Stop reaction
B) Favor the decomposition N_2O_4 D) Not alter the equilibrium
88. In the reaction $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$ at equilibrium, Some I_2 is added. What happens to the equilibrium?
A) It gets shifted to the right C) It remains unchanged
B) It gets shifted to the left D) first (b) then (c)
89. For the reaction $\text{CO}(\text{g}) + 2\text{H}_2(\text{g}) \rightleftharpoons \text{CH}_3\text{OH}(\text{g})$, true condition is
A) $K_p = K_c$ B) $K_p < K_c$ C) $K_p > K_c$ D) $K_c = 0$ but $K_p \neq 0$
90. Which of the following acts as a buffer solution?
A) 0.4M HCl & 0.2M NaOH C) 0.4M HCl & 0.2M NH_4OH
B) 0.4M NH_4OH & 0.2M HCl D) 0.4M NaOH & 0.2M HCl
91. pOH of tomatoes is?
A) 4.2 B) 3.1 C) 9.8 D) 11.9
92. For an equilibrium situation $K_c = x^2 / V(a - x)$; by increasing the pressure, the position of equilibrium will shift:
A) Forward C) Backward
B) Position of equilibrium will not change D) May shift in forward or backward direction
93. pH=4, then $[\text{OH}^{-1}]$ is?
A) 10^{-10} B) -4 C) 4 D) 10^{-4}
94. Weak acids have?
A) small pK_a values C) large K_a values
B) Weak conjugate bases D) Strong conjugate bases
95. For the reaction, $2\text{H}_2\text{S}(\text{g}) \rightleftharpoons 2\text{H}_2(\text{g}) + \text{S}_2(\text{g})$ $K_p = 1.2 \times 10^{-2}$ at 1065°C . For this reaction:
A) $K_c < K_p$ B) $K_p = K_c$ C) $K_c > K_p$ D) $K_c \geq K_p$
96. The reaction $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$ is an example of
A) Backward reaction C) forward reaction
B) Irreversible reaction D) reversible reaction
97. For a reversible reaction, if the concentrations of the reactants are double, at constant temperature the equilibrium constant will be
A) one-fourth B) Doubled C) Halved D) the same
98. If equilibrium constant for the reaction $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$ is K_c , then the equilibrium constant for the reaction $\text{NH}_3 \rightleftharpoons \frac{1}{2}\text{N}_2 + \frac{3}{2}\text{H}_2$ will be
A) $\frac{1}{K_c}$ B) $\sqrt{K_c}$ C) $\frac{1}{K_c^2}$ D) $\frac{1}{\sqrt{K_c}}$
99. $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3(\text{g})$, in the above reaction K_p and K_c are related as
A) $K_p = K_c \times (\text{RT})$ C) $K_p = K_c \times (\text{RT})^{-1}$
B) $K_p = K_c \times (\text{RT})^2$ D) $K_p = K_c \times (\text{RT})^{-2}$
100. Which of the following change will shift the reaction in forward direction?
 $\text{I}_2(\text{g}) \rightleftharpoons 2\text{I}(\text{g})$ Take $\Delta H^\circ = 150 \text{ KJ}$
A) Increase in concentration of I C) Increase in total Pressure
B) decrease in concentration of I_2 D) Increase in temperature
101. A reversible reaction is said to have attained equilibrium, when
A) backward reaction stops
B) both backward and forward reactions take place at equal speed
C) both backward and forward reactions stop
D) Concentration of each of the reactions and products becomes equal
102. In what manner will increase of pressure affect the following equilibrium?
 $\text{C}(\text{s}) + \text{H}_2\text{O}(\text{g}) \rightleftharpoons \text{CO}(\text{g}) + \text{H}_2(\text{g})$
A) Shift in the reverse direction C) Shift in the forward direction
B) increase in the yield of hydrogen D) no effect
103. At 90°C , pure water has H_3O^+ ion concentration of $10^{-6} \text{ mol/L}^{-1}$. The K_w at 90°C is?

104. Which of the following equilibrium, in gaseous phase, would be unaffected by an increase in pressure?
 A) 10^{-6} B) 10^{-12} C) 10^{-14} D) 10^{-8}
 A) $N_2 + 3H_2 \rightleftharpoons 2NH_3$ C) $N_2 + O_2 \rightleftharpoons 2NO$
 B) $N_2O_4 \rightleftharpoons 2NO_2$ D) $CO + \frac{1}{2} O_2 \rightleftharpoons CO_2$
105. For the chemical reaction $3X(g) + Y(g) \rightleftharpoons X_3Y(g)$, the amount of X_3Y at equilibrium is affected by
 A) Temperature and pressure C) Temperature only
 B) Pressure only D) Temperature, pressure and catalyst
106. For the reaction $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ the forward reaction at constant temperature is favored by
 1) Introducing PCl_3 gas at constant volume
 2) introducing Cl_2 gas at constant volume
 3) Increasing the volume of the container
 4) Introducing PCl_5 at constant volume
 A) 1, 2, 3 B) 3, 4 C) 2, 3 D) 1, 2, 3, 4
107. Reaction quotient for the reaction $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ is given by $Q = \frac{[NH_3]^2}{[N_2][H_2]^3}$ the reaction will proceed from right to left, when
 A) $Q < K_c$ C) $Q = 0$
 B) $Q > K_c$ D) $Q = K_c$
108. For the reaction $H_2 + I_2 \rightleftharpoons 2HI$, the equilibrium concentration of H_2 , I_2 and HI are 8, 3 and 24 mol/L respectively. Equilibrium constant of the reaction is
 A) 32.67 B) 12 C) 24 D) 36.67
109. In which of the following case, the value of K_p is less than K_c ?
 A) $N_2 + O_2 \rightleftharpoons 2NO$ C) $H_2 + Cl_2 \rightleftharpoons 2HCl$
 B) $2SO_2 + O_2 \rightleftharpoons 2SO_3$ D) $PCl_5 \rightleftharpoons PCl_3 + Cl_2$
110. In a chemical equilibrium rate constant of forward reaction is 7.5×10^{-4} and the equilibrium constant is 1.5. The rate constant of backward reaction is.
 A) 2.5×10^4 B) 2.5×10^{-4} C) 5×10^{-4} D) 5×10^4
111. The value of K_p for the reaction, $2H_2S(g) \rightleftharpoons 2H_2(g) + S_2(g)$ is 1.2×10^{-2} at $1065^\circ C$. the value for K_c is
 A) $< 1.2 \times 10^{-2}$ B) 1.2×10^{-2} C) $> 1.2 \times 10^{-2}$ D) 0.12×10^{-1}
112. Which of the following base is the weakest?
 A) $NH_4OH : K_b = 1.6 \times 10^{-6}$ C) $C_6H_5NH_2 : K_b = 3.8 \times 10^{-10}$
 B) $C_2H_5NH_2 : K_b = 5.6 \times 10^{-4}$ D) $C_6H_7N : K_b = 6.3 \times 10^{-10}$
113. 1 mole of CH_3COOH and 1 mole of C_2H_5OH reacts to produce $\frac{2}{3}$ mole of $CH_3COOC_2H_5$. The equilibrium constant is:
 A) -2 B) -4 C) 2 D) 4
114. The equilibrium constant for the following reaction will be $3A + 2B \rightleftharpoons C$
 A) $\frac{[2A][2B]}{[C]}$ B) $\frac{[C]}{[A]^2[B]^2}$ C) $\frac{[C]}{[3A][2B]}$ D) $\frac{[C]}{[A]^3[B]^2}$
115. The equilibrium constant of a reaction is 300. If the volume of reaction flask is tripled. The equilibrium constant is
 A) 300 B) 900 C) 600 D) 100
116. For a gaseous reaction $2A + B \rightleftharpoons C + D$, The partial pressure of A, B, C and D at equilibrium are 0.5, 0.8, 0.7 and 1.2 atm. The value of K_p for this reaction is
 A) 2.4 atm B) 4.2 atm^{-1} C) 6.2 atm^{-2} D) 8.4 atm^{-3}
117. The ratio of K_p/K_c for the reaction $SO_2(g) + \frac{1}{2} O_2(g) \rightleftharpoons SO_3(g)$ is
 A) $(RT)^{-1/2}$ B) RT C) $(RT)^{1/2}$ D) 1
118. If K_p the reaction $A(g) + 2B(g) \rightleftharpoons 2C(g) + 2D(g)$ is 0.05 at 1000 K, then the value K_c of the reaction
 A) 20000 R B) $5 \times 10^{-5}/R$ C) 0.02 R D) $5 \times 10^{-5} R$
119. A chemical reaction is catalyzed by a catalyst X. Hence, X
 A) Increases activation energy of the reaction
 B) Does not affect equilibrium constant of the reaction
 C) Decreases rate constant of the reaction
 D) Reduces enthalpy of the reaction
120. Consider the reaction equilibrium, $2SO_2 + O_2 \rightleftharpoons 2SO_3$ with $\Delta H^\circ = -198 \text{ kJ}$. On the basis of Le Chatelier's principle, the conditions favorable for forward reaction is:
 A) Lowering of temperature as well as pressure
 B) Lowering the temperature and increasing the pressure
 C) Increasing temperature as well as pressure
 D) Any value of temperature and pressure
121. In presence of a catalyst, what happens to the chemical equilibrium?

1. energy of activation of the forward and reverse reactions is lowered by the same amount.
2. Equilibrium amount is not disturbed.
3. Rates of forward and reverse reaction increase by the same factor.
4. More products is formed

A) (II, III, IV) B) (I, II, III) C) (I, II, IV) D) (I, III, IV)

122. The following equilibrium exists in aqueous solution $\text{CH}_3\text{COOH} \rightleftharpoons \text{CH}_3\text{COO}^- + \text{H}^+$. If dil. HCl is added without change in temperature, the:

- A) concentration of CH_3COO^- will increase C) the equilibrium constant will increase
 B) concentration of CH_3COO^- will decrease D) the equilibrium constant will decrease

123. Which of the following can act both as a Bronsted acid and a Bronsted base?

- A) O^{2-} B) HSO_4^- C) HCl D) Na_2CO_3

124. The pH of a 0.1 molar solution of the acid HA is 3. The value of the ionization constant, K_a of this acid is:

- A) 3×10^{-1} B) 1×10^{-5} C) 1×10^{-3} D) 3×10^{-7}

125. An aqueous solution of ammonia consists of:

- A) H^+ B) NH_4^+ C) OH^- D) NH_4^+ and OH^-

126. The number of H^+ ions present in 1 cm^3 of a solution whose pH is 10 is:

- A) 10^{-10} B) 6.02×10^{10} C) 10^{-13} D) 6.02×10^{13}

127. The pH of 0.1 M solution of the following substances increases in the order:

- A) $\text{NaCl} < \text{NH}_4\text{Cl} < \text{NaCN} < \text{HCl}$ C) $\text{HCl} < \text{NH}_4\text{Cl} < \text{NaCl} < \text{NaCN}$
 B) $\text{NaCN} < \text{NH}_4\text{Cl} < \text{NaCl} < \text{HCl}$ D) $\text{HCl} < \text{NaCl} < \text{NaCN} < \text{NH}_4\text{Cl}$

128. On addition of ammonium chloride to a solution of ammonium hydroxide:

- A) dissociation of NH_4OH increases C) concentration of OH^- decreases
 B) concentration of NH_4^+ and OH^- increases D) concentration of NH_4^+ decreases

129. What is the result of an increase in the temperature of a system at equilibrium?

- A) The endothermic reaction is favoured, and the reaction rate decreases
 B) The endothermic reaction is favoured, and the reaction rate increases
 C) The exothermic reaction is favoured, and the reaction rate decreases
 D) The exothermic reaction is favoured, and the reaction rate increases

130. According to Le Chatelier's principle, which chemical system shifts to the right when pressure is increased?

- A) $\text{CO}_2(\text{g}) + \text{H}_2(\text{g}) \rightleftharpoons \text{CO}(\text{g}) + \text{H}_2\text{O}(\text{g})$ C) $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$
 B) $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$ D) $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$

131. For the reaction, $2\text{NO}_2(\text{g}) \rightleftharpoons \text{N}_2\text{O}_4(\text{g})$, which value of the equilibrium constant indicates the largest concentration of NO_2 ?

- A) 1.8×10^{-2} B) 1.5×10^{-1} C) 0.41 D) 0.87

132. Which change would favour the net reverse reaction for the system, $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3 + \text{heat}$

- A) a decrease in the concentration of ammonia
 B) a decrease in the concentration of nitrogen
 C) a decrease in the temperature
 D) a decrease in the volume

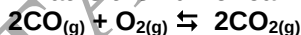
133. Which change will increase the amount of SO_3 $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{SO}_3 + \text{heat}$

- A) Decrease the concentration of $\text{O}_2(\text{g})$ C) Increase the temperature of the system
 B) Increase the pressure on the system D) Introduce a catalyst

134. What affects the numerical value of the equilibrium constant for a reversible reaction at equilibrium?

- A) Adding a catalyst C) changing the pressure
 B) Changing reactant concentrations D) changing the temperature

135. What is the numerical value of the equilibrium constant for the system:



If the equilibrium concentrations are $[\text{CO}] = 2.0$, $[\text{O}_2] = 1.0$, and $[\text{CO}_2] = 16$?

- A) 8.0 B) 32 C) 64 D) 128

136. Which of the following equilibria would be affected by pressure changes at constant temperature?

1. $\text{FeO}(\text{s}) + \text{CO}(\text{g}) \rightleftharpoons \text{Fe}(\text{s}) + \text{CO}_2(\text{g})$
2. $\text{CaCO}_3(\text{s}) \rightleftharpoons \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
3. $2\text{Mg}(\text{s}) + \text{CO}_2(\text{g}) \rightleftharpoons 2\text{MgO}(\text{s}) + \text{C}(\text{s})$

- A) 1 and 2 only B) 1 and 3 only C) 2 and 3 only D) 1, 2 and 3

137. For the equilibrium, $2\text{NO}(\text{g}) + 2\text{CO}(\text{g}) \rightleftharpoons \text{N}_2(\text{g}) + 2\text{CO}_2(\text{g}) + \text{heat}$, the reaction is favored in forward direction by?

- A) high temperature and high pressure C) low temperature and high pressure
 B) high temperature and low pressure D) low temperature and low pressure

138. The equilibrium constant at 1300 K for the reaction $\text{H}_2(\text{g}) + \text{Br}_2(\text{g}) \rightleftharpoons 2\text{HBr}$ is 1.6×10^5 . What is the value of K_c for the reverse reaction?

- A) -1.6×10^5 B) 6.3×10^{-6} C) 1.6×10^{-5} D) 6.3×10^{-5}

139. Why does increasing the concentrations of the reactants in a chemical reaction increase the rate of the reaction?
 A) The activation energy of the reaction decreases
 B) The average kinetic energy of the reactants increases
 C) The collisions become more effective
 D) The frequency of collisions increases
140. What is the result of increasing the concentration of CH_3COOH in this equilibrium system?

$$\text{CH}_3\text{COOC}_2\text{H}_5(\text{aq}) + \text{H}_2\text{O}(\text{l}) \rightleftharpoons \text{C}_2\text{H}_5\text{OH}(\text{aq}) + \text{CH}_3\text{COOH}(\text{aq})$$

 A) a change in the equilibrium constant
 B) a decreased concentration of H_2O
 C) a decreased concentration of $\text{CH}_3\text{COOC}_2\text{H}_5$
 D) a decreased concentration of $\text{C}_2\text{H}_5\text{OH}$

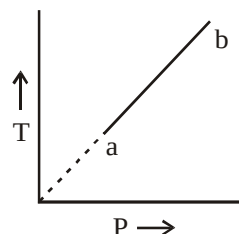
PHYSICS

141. The value of universal gas constant is
 A) $8.314 \text{ J mol}^{-1}\text{K}^{-1}$
 B) $8314 \text{ Jmol}^{-1}\text{K}^{-1}$
 C) $1.38 \times 10^{10} \text{ Jmole}^{-1} \text{ K}^{-1}$
 D) $237 \text{ Jmol}^{-1} \text{ K}^{-1}$
142. In an isothermal change of an ideal gas $\Delta U = 0$, the change in heat energy ΔQ is equal to
 A) $0.5W$
 B) W
 C) $1.5W$
 D) $2W$
143. The mass of O_2 molecules is 16 times that of H_2 molecules. The rms velocity of O_2 molecules at room temperature is V_{rms} . The rms velocity of H_2 molecules at the same temperature will be
 A) $16 V_{\text{rms}}$
 B) $4 V_{\text{rms}}$
 C) $\frac{V_{\text{rms}}}{4}$
 D) $\frac{V_{\text{rms}}}{16}$
144. A gas at NTP is slowly compressed to one fourth of its original volume, then final pressure is:
 A) 4 atmosphere
 B) 0.75 atmosphere
 C) 8 atmosphere
 D) 0.25 atmosphere
145. The internal energy of a monoatomic ideal gas is
 A) Only kinetic energy
 B) Only potential energy
 C) Partly kinetic and partly potential energies
 D) None of these
146. Pressure of ideal gas is written as
 A) $P = \frac{1}{3} \langle v^2 \rangle \rho$
 B) $P = \frac{2}{3} \langle v^2 \rangle \rho$
 C) $P = \frac{1}{3} \langle v^2 \rangle \rho$
 D) $P = \frac{1}{2} \langle v^2 \rangle \rho$
147. What is the approximate number of atoms in a cubic metre of an ideal monoatomic gas at a temperature of 27°C and pressure of $1 \times 10^5 \text{ Pa}$?
 A) 1×10^{22}
 B) 6×10^{23}
 C) 2×10^{25}
 D) 3×10^{26}
148. The mean translational energy per molecule of an ideal gas is,
 A) $\frac{2}{3} KT$
 B) $\frac{3}{2} KT$
 C) $\frac{8}{2} KT$
 D) $\frac{3}{2} KT^3$
149. A gas does 4.5 J of external work during adiabatic expansion. Its temperature falls by 2K. Its internal energy will
 A) Increase by 4.5 J
 B) Decrease by 4.5 J
 C) Decrease by 2.25 J
 D) Increase by 9.0 J
150. For an ideal gas of diatomic molecules
 A) $C_p = \frac{5}{2} R$
 B) $C_v = \frac{3}{2} R$
 C) $C_p - C_v = 2R$
 D) $C_p = \frac{7}{2} R$
151. For a gas $\frac{R}{C_v} = 0.67$. This gas is made up of molecules which are
 A) Diatomic
 B) Mixture of diatomic and polyatomic molecules
 C) Monoatomic
 D) Polyatomic
152. Two gases of equal mass are in thermal equilibrium. If P_a, P_b and V_a and V_b are their respective pressures and volumes, then which relation is true
 A) $P_a \neq P_b; V_a = V_b$
 B) $P_a = P_b; V_a \neq V_b$
 C) $\frac{P_a}{V_a} = \frac{P_b}{V_b}$
 D) $P_a V_a = P_b V_b$
153. To what temperature should the hydrogen at 327°C be cooled at constant pressure, so that the root mean square velocity of its molecules become half of its previous value
 A) -123°C
 B) 123°C
 C) -100°C
 D) 0°C

154. An ideal gas changes from state 'a' to state 'b' as shown in figure.

What is the work done by the gas in the process?

- A) Zero
B) Positive
C) Negative
D) Infinite

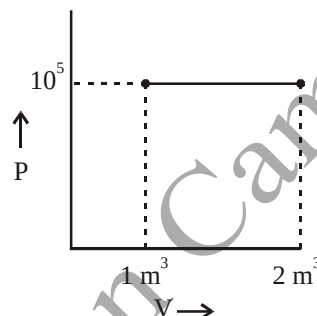


155. What is the approximate number of atoms in a cubic metre of an ideal monoatomic gas at a temperature of 27°C and pressure of $1 \times 10^5 \text{ Pa}$?

- A) 1×10^{22}
B) 6×10^{23}
C) 2×10^{25}
D) 3×10^{26}

156. The work done in figure is:

- A) $3 \times 10^5 \text{ J}$
B) $2 \times 10^5 \text{ J}$
C) 10^5 J
D) Zero



157. The difference between C_p and C_v is equal to:

- A) Universal gas constant
B) Molar gas constant
C) Plank's constant
D) Boltzmann constant

158. The number of translational degrees of freedom for a diatomic gas is

- A) 2
B) 3
C) 5
D) 6

159. At constant volume the temperature is increased. Then

- A) Collision on walls will be less
B) Number of collisions per unit time will increase
C) Collisions will be in straight lines
D) Collisions will not change

160. Internal energy per mole of gas depends on

- A) Viscosity
B) Density
C) Temperature
D) Thermal conductivity

161. To double the translation kinetic energy of the molecules of a gas, one has to

- A) Double the absolute temperature
B) Reduce the absolute temperature process
C) Increase the absolute temperature fourfold
D) Increase the absolute temperature by a factor of $\sqrt{2}$

162. According to kinetic theory of gases, molecules of a gas behave like

- A) Inelastic spheres
B) Perfectly elastic rigid spheres
C) Perfectly elastic non-rigid spheres
D) Inelastic non-rigid spheres

163. In a cyclic process the change in internal energy of a system is

- A) Minimum but not zero
B) Zero
C) Maximum but not infinite
D) Infinite

164. An ideal gas has an initial pressure of 3 pressure units and an initial volume of 4 volume units. The table gives the final pressure and volume of the gas (in those same units) in four, processes. Which processes start and end on the same isotherm

- A) A
B) B
C) C
D) D

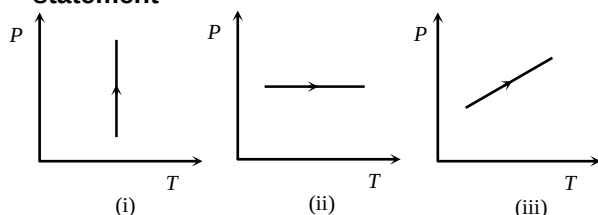
	A	B	C	D
P	5	4	12	6
V	7	6	1	3

165. One mole of a monoatomic ideal gas is mixed with one mole of a diatomic ideal gas. The molar specific heat of the mixture at constant volume is

- A) 8
B) $\frac{3}{2} R$
C) $2R$
D) $2.5 R$

166. A gas is enclosed in a closed pot. On keeping this pot in a train moving with high speed, the temperature of the gas
 A) Will increase
 B) Will decrease
 C) Will remain the same
 D) Will change according to the nature of the gas
167. The *r.m.s.* velocity of a gas at a certain temperature is $\sqrt{2}$ times than that of the oxygen molecules at that temperature. The gas can be
 A) H_2
 B) He
 C) CH_4
 D) SO_2
168. At what temperature, the mean kinetic energy of O_2 will be the same for H_2 molecules at $-73^\circ C$
 A) $127^\circ C$
 B) $527^\circ C$
 C) $-73^\circ C$
 D) $-173^\circ C$

169. Pressure versus temperature graphs of an ideal gas are as shown in figure. Choose the wrong statement



- A) Density of gas is increasing in graph (i)
 B) Density of gas is decreasing in graph (ii)
 C) Density of gas is constant in graph (iii)
 D) None of these
170. The specific heat of an ideal gas is
 A) Proportional to T
 B) Proportional to T^3
 C) Proportional to T^2
 D) Independent of T

171. Which of the following formulae is wrong

A) $C_V = \frac{R}{\gamma - 1}$
 B) $C_P = \frac{\gamma R}{\gamma - 1}$
 C) $C_P / C_V = \gamma$
 D) $C_P - C_V = 2R$

172. Which of the following statements about kinetic theory of gases is wrong

- A) The molecules of a gas are in continuous random motion
 B) The molecules continuously undergo inelastic collisions
 C) The molecules do not interact with each other except during collisions
 D) The collisions amongst the molecules are of short duration

173. In thermodynamic process, 200 Joules of heat is given to a gas and 100 Joules of work is also done on it. The change in internal energy of the gas is

A) 100 J
 B) 300 J
 C) 419 J
 D) 24 J

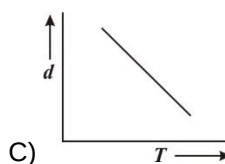
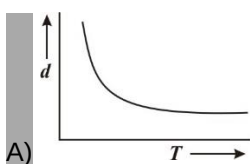
174. A system does 600J of work at the same time has its internal energy increased by 320J. How much heat has been supplied.

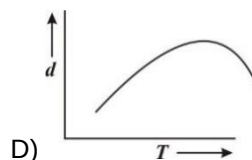
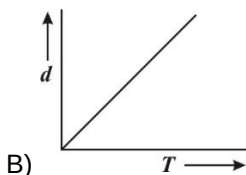
A) 280 J
 B) 920 J
 C) 600 J
 D) 20 J

175. A gas in a cubical container contains three molecules each having speed of 2 ms^{-1} , 4 ms^{-1} and 4 ms^{-1} . What is the root mean square speed?

A) $\frac{36}{3} \text{ ms}^{-1}$
 B) 6 ms^{-1}
 C) 12 ms^{-1}
 D) $\sqrt{12} \text{ ms}^{-1}$

176. At a constant pressure, of the following graphs the one which represents the vibration of the density of an ideal gas with the absolute temperature T , is:





177. Some oxygen gas is in a sealed container that has a constant volume. What will happen to the oxygen molecules when the gas is heated?
 A) They will expand C) They will move further apart
 B) They will move more quickly D) They will become more dense
178. Oxygen molecules in the earth's atmosphere have root-mean square speed of about 500ms^{-1} . If the relative molecular mass of oxygen and helium is 32 and 4 respectively, then the approximate root mean square speed of helium molecules in the atmosphere will be.
 A) 180ms^{-1} B) 1400ms^{-1} C) 1000ms^{-1} D) 2000ms^{-1}
179. A gas molecule x moving with the speed 100 m/s suffers elastic collision with a molecule y of the same gas which is moving with speed 150m/s. Then after collision:
 A) speed of both molecules will be 125 m/s C) speed of x will be 125 m/s
 B) speed of y only will be 125 m/s D) speed of x will be 150 m/s
180. Which one is true for internal energy?
 A) It is sum of all forms of energies associated with molecules of a system
 B) It is a state function of a system
 C) It is proportional to transnational K.E of the molecules
 D) All are correct

ENGLISH

Choose the correct word words to complete each sentence.

181. I find it _____ that nothing has been done to protect passengers from fire.
 A) expressive C) mammoth
 B) ludicrous D) juggernaut
182. He suddenly felt _____, and went to the sink and heaved uncontrollably.
 A) enigmatic C) largess
 B) extraneous D) nauseous
183. I have a dream that one day this nation will rise up and live _____ the true meaning of its creed.
 A) out C) away
 B) off D) of
184. Like the children who came _____ quick succession, the times, too, had changed fast.
 A) For C) Of
 B) To D) In

SPOT THE ERROR: In the following sentences some segments of each sentence are underlined. Your task is to identify that underlined segment of the sentence, which contains the mistake that needs to be corrected. Fill the circle corresponding to that letter under the segment in the MCQ Response Form.

185. If a queen had lived in the rooms near theirs, Della would have washed and dried her hair where the queen could see theirs.
 A B C D
186. The mentor as well as his disciples has reached the seminar hall with our documents.
 A B C D
187. The gold seemed to shine softly as if from her own warm and loving spirit.
 A B C D
188. Between you and I, he is a jolly person who always makes others laugh.
 A B C D
189. I have a dream that one day even the state of Mississippi, a state sweltering with the heat of injustice, will be transformed into oasis of freedom and justice.
 A B C D
190. He is remarkable for his ingenuity of the use of ironical coincidences and for his skillful plots.
 A B C D

In each of the following questions, four alternative sentences are given Choose the CORRECT one and fill the circle corresponding to that letter in the MCQ Response Form.

191.

- A) Either of the two itinerants has not been able to produce his ticket during the journey.
- B) Either of the two itinerants has not been able to produce their ticket during the journey.
- C) Either of the two itinerants have not been able to produce his tickets during the journey.
- D) Either of the two itinerants has not been able to produce his or her tickets during the journey.

192.

- A) There is no question of my lampooning my colleagues as it is disgusting.
- B) There is no question of me lampooning my colleagues as it is disgusting.
- C) There is no question of I lampooning my colleagues as it is disgusting.
- D) There is no question of my lampooning my colleagues as who is disgusting.

193.

- A) The grip of his teeth on his gums had for long been loose.
- B) The grip of his tooth on his gums had for long been loose.
- C) The grip of his tooth on his gums had for long been loose.
- D) The grip of his teeth on his gums had for long been lose.

194.

- A) Some of you have come from the areas where your quest for freedom left you batter by the storms of persecution.
- B) Some of you have come from the areas where your quest for freedom left you battered by the storm of persecution.
- C) Some of you have come from the areas where your quest for freedom left you battered by the storms of persecution.
- D) Some of you have come from the areas where your quest for freedom left you battered into the storms of persecution.

195.

- A) A month or so later Chips heard that he had been killed at Pssschendaele.
- B) A month or so later Chips heard that he had been killed at Psschendaele.
- C) A month or so later Chips heard that he had been killed at Pssschendael.
- D) A month or so later Chips heard that he had been killed at Pssschendale.

196.

- A) It was Katherine who suggested that a team from the mission should come up to Brookfield.
- B) It was Katherine who suggested that a team from the mission could come up to Brookfield.
- C) It was Katherine who suggested that a team from the mission must come up to Brookfield.
- D) It was Katherine who suggests that a team from the mission should come up to Brookfield.

197.

- A) Even the wives of the masters, tempted at first to be jealous from someone so young and lovely.
- B) Even the wives of the masters, tempted at first to be jealous with someone so young and lovely.
- C) Even the wives of the masters, tempted on first to be jealous of someone so young and lovely.
- D) Even the wives of the masters, tempted at first to be jealous of someone so young and lovely.

198.

- A) Each sold the most valuable thing he owned in order to buy a gift for the other.
- B) Each sold the most valuable thing she owned in order to buy a gift for the other.
- C) Each sold the most valuable thing he or they owned in order to buy a gift for the other.
- D) Each sold the most valuable thing he owned in order to buy a gift for the others people.

In each of the following questions, four alternative meanings of a word are given. You have to select the NEAREST CORRECT MEANING of the given word and fill the appropriate Circle on the MCQ Response Form.

199. Native

- A) Inhabited
- B) Enrage
- C) Formidable
- D) Sadist

200. Nuisance

- A) Deviation
- B) Grievance
- C) Belligerent
- D) Abundance

201. Meditated

202. **Miniature**

- A) Wee
- B) Bribe

- C) Mused
- D) Stagnant

203. **Mayhem**

- A) Harmony
- B) Altruism

- C) Bloom
- D) Serenity

- C) Penury
- D) Impairment

In each of the following questions, four alternative words are given. You have to select the option OPPOSITE in meaning to the given word and fill the appropriate Circle on the MCQ Response Form.

204. **Mustered**

- A) Sprightly
- B) Shabby

- C) Constant
- D) Disseminated

205. **Mumbled**

- A) Restricted
- B) Mobilized

- C) Elaborated
- D) Ruminated

STARS Academy multan Campus